

**ABSTRACT**

An ion source 10 for producing a beam of ions from a plasma is disclosed. A plasma  
5 is created at the centre of an anode 12 by collisions between energetic electrons and  
molecules of an ionizable gas. The electrons are sourced from a cathode filament 11  
and are accelerated to the anode 12 by an applied electric potential. A projection of  
the anode and a magnetic field having an axis aligned with the axis of the anode act  
together to concentrate the flow of electrons to the centre of the anode 12. The  
10 ionizable gas is introduced into an ionization region 13 of the ion source 10 at the  
point of concentrated electron flow. Ions created in the ionization region are expelled  
from the ion source as an ion beam centred on the axis of the magnetic field. The  
surfaces of the anode are coated with an electrically conductive non-oxidising layer of  
Titanium Nitride to prevent a build up of an insulating layer on the anode.